# PATENT COOPERATION TREATY

# PCT

REC'D 3 0 MAY 2006

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

### (PCT Article 36 and Rule 70)

| Applicant's or agent's file reference<br>P29163WO Ru/ | **FOR FURTHER ACTION** | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |
|---|---|---|
| International application No.<br>PCT/EP2004/009057 | International filing date *(day/month/year)*<br>12.08.2004 | Priority date *(day/month/year)*<br>18.02.2004 |
| International Patent Classification (IPC) or both national classification and IPC<br>INV. H04L29/06 H04L12/56 | | |
| Applicant<br>SONY DEUTSCHLAND GMBH | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   | | | |
   |---|---|---|
   | I | ☒ | Basis of the opinion |
   | II | ☐ | Priority |
   | III | ☐ | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
   | IV | ☐ | Lack of unity of invention |
   | V | ☒ | Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
   | VI | ☐ | Certain documents cited |
   | VII | ☐ | Certain defects in the international application |
   | VIII | ☐ | Certain observations on the international application |

| Date of submission of the demand<br><br>09.11.2005 | Date of completion of this report<br><br>29.05.2006 |
|---|---|
| Name and mailing address of the international preliminary examining authority:<br><br>European Patent Office - P.B. 5818 Patentlaan 2<br>NL-2280 HV Rijswijk - Pays Bas<br>Tel. +31 70 340 - 2040 Tx: 31 651 epo nl<br>Fax: +31 70 340 - 3016 | Authorized Officer<br><br>Behringer, L.V.<br><br>Telephone No. +31 70 340-3444 |

## I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

**Description, Pages**

1-29                      as originally filed

**Claims, Numbers**

1-9                      received on 09.11.2005 with letter of 09.11.2005

**Drawings, Sheets**

1/4-4/4              as originally filed

2. With regard to the **language,** all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language:      , which is:

- ☐   the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐   the language of publication of the international application (under Rule 48.3(b)).
- ☐   the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐   contained in the international application in written form.
- ☐   filed together with the international application in computer readable form.
- ☐   furnished subsequently to this Authority in written form.
- ☐   furnished subsequently to this Authority in computer readable form.
- ☐   The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐   The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐   the description,     pages:
- ☐   the claims,         Nos.:
- ☐   the drawings,      sheets:

5. ☐   This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

     *(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Yes: | Claims | 1-9 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 3,4,8,9 |
| | No: | Claims | 1,2,5-7 |
| Industrial applicability (IA) | Yes: | Claims | 1-9 |
| | No: | Claims | |

2. Citations and explanations

     **see separate sheet**

**Re Item V.**

1    The following document is referred to in this communication:

D1 :   DE 100 39 954 A (SIEMENS AG) 28 February 2002 (2002-02-28)

2    The amendments filed with the letter dated 9 November 2005 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned are the following (claim 1):

> sending out voting messages to the detected nodes **to ensure that only the said device can register at nodes in the environment for a preprogrammed time interval**

The description discloses on page 11, 2nd paragraph:

> To that end, said device 201a monitors the environment to detect other nodes. **After a certain time interval,** said device 201a sends out „voting messages" to the detected nodes.

According to the description the voting messages are sent out after a certain time interval, the claim states that said device can register for a preprogrammed time interval, thereby causing the introduction of subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b).

Claims 2-8 are dependent on claim 1. Therefore this written opinion is based on claims 1-8 as originally filed and on claim 9 as filed with the letter of 9 November 2005.

3    The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 2, 5 - 7 does not involve an inventive step in the sense of Article 33(3) PCT.

3.1   The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):

A method for registering and authenticating a wireless communication device
with a wireless ad-hoc network (see column 1, lines 3-6), said method being
characterized by the following steps: wirelessly transmitting a registration
request message from the requesting device to a node authorized to register
said device to the network (see column 1, lines 48-50), authenticating said
requesting device towards the user by playing an audio-visual signal (see
column 1, line 61 - column 2, line 2), authenticating said authorized node
towards the user by playing an audio-visual signal (see column 1, line 61 -
column 2, line 2), sanctioning the registration by the user in case the device and
the authorized node playing the audio-visual signal are the ones the user
intended to use (see column 1, lines 56 - 58).

From this, the subject-matter of independent claim 1 differs in:

wirelessly transmitting a registration message in the positive case from said
authorized node to said requesting device.

The problem to be solved by the present invention may therefore be regarded as how
to inform the requesting device with the outcome of the registration request?

The solution proposed in claim 1 of the present application cannot be considered as
involving an inventive step (Article 33(3) PCT) for the following reasons.

The feature "wirelessly transmitting a registration message in the positive case from
said authorized node to said requesting device" is merely one of several straight-
forward possibilities from which the skilled person would select, in accordance with
circumstances, without the exercise of inventive skill, in order to solve the problem
posed. In D1 itself is already disclosed that unregistered devices cannot
communicate with the device (see column 3, lines 14-19). Consequently, if an
unregistered device would try to communicate with the ad-hoc network, it wouldn't
receive any replies, and learn that the registration was not allowed. If however a
registered device would try to communicate with the ad-hoc network, then it would
receive answers (see column 1, lines 58-60), thereby indirectly knowing that the
registration was allowed.

3.2   Dependent claims 2, 5 - 7 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step.

> Claim 2: see D1, column 2, lines 16 - 29
> Claim 5: see D1, column 1, line 66 - column 2, line 2
> Claim 6: see D1, column 1, lines 62 - 65
> Claim 7: see D1, column 1, line 62 - column 2, line 2

3.3   The combination of the features of dependent claims 3, 4, 8 is neither known from, nor rendered obvious by, the available prior art.

3.4   The document D1 is regarded as being the closest prior art to the subject-matter of claim 9, and shows (the references in parentheses applying to this document):

> A wireless communication device to be registered to a wireless multi-hop ad-hoc network (see column 1, lines 3-6; it is further known by people skilled in the art that Bluetooth supports multi-hop networks like scatternets), characterized by user interaction and control means for controlling the registration and authentication process (see column 1, lines 52-58), and signaling means for audio-visually signaling said information to authenticate the identity of the wireless communication device (see column 1, line 61 - column 2, line 2).

The subject-matter of claim 9 differs from this known wireless communication device in having additionally:

a)   processing means for determining the nearest wireless node in the environment of the wireless communication device being authorized to register said device to the network by evaluating wirelessly received response messages from said nodes,

b)   decryption means for decrypting information wirelessly received from, audio-visually signaled and encrypted by the authorized wireless node by means of a secret key which is known to both the wireless communication device and the authorized wireless node.

The subject-matter of claim 9 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention as characterised in claim 9 may be regarded as how to prevent man-in-the-middle attacks when registering a wireless communications device.

The solution to this problem proposed in claim 9 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The combination of features a) and b) of characterising part are neither disclosed nor rendered obvious by any of the documents cited in the search report.

<u>1+</u>

## <u>Claims</u>

5     1. A method for registering and authenticating a wireless
       communication device (201a) with a wireless ad-hoc
       network,
       said method being characterized by the following steps:
       - wirelessly transmitting (S1a) a registration request
10       message from the requesting device (201a) to a node
         (201b) authorized to register (S3a) said device (201a)
         to the network,
       - <u>monitoring the environment of said device (201a) to</u>
         <u>detect other nodes,</u>
15     - <u>sending out voting messages to the detected nodes to</u>
         <u>ensure that only the said device (201a) can register at</u>
         <u>nodes in the environment for a preprogrammed time</u>
         <u>interval,</u>
       - authenticating (S2) said requesting device (201a)
20       towards the user by playing an audio-visual signal,
       - authenticating said authorized node (210b) towards the
         user by playing an audio-visual signal,
       - sanctioning the registration by the user in case the
         device (201a) and the authorized node (201b) playing the
25       audio-visual signal are the ones the user intended to
         use, and
       - wirelessly transmitting (S3a) a registration message in
         the positive case from said authorized node (201b) to
         said requesting device (201a).
30
       2. A method according to claim 1,
       characterized by the following step:
       in case the wireless communication device (201a) and/or
       the wireless node (201b) registers (S5a) the lack of an
35     acceptance or rejection message after a preprogrammed time

interval has expired, terminating (S5b) the authentication
and registration process.

3. A method according to anyone of the preceding claims,
5    characterized in that
        -said audio-visual signals by the wireless
        communication device (201a) and by the authorized
        wireless node (201b) have a common structure out of a
        large number of possible structures so the user can
10      make his sanctioning decision dependent on whether
        both signals have the same structure, and
        -the description of the audio-visual signal to be
        signaled by said device (201a) is wirelessly sent by
        said authorized node (201b) in an encrypted way, so
15      only said requesting device (201a) can decrypt it.

4. A method according to anyone of the preceding claims,
characterized by the step of
identifying registered devices (201b+c) of a specific
20   wireless multi-hop ad-hoc network by decrypting and
recognizing a network-identifying signal out of a range of
different possible signals that is specific for said
network generated by a wireless node (201b) connected to
said network.
25

5. A method according to claim 4,
characterized in that
said network-identifying signal is an audio signal.

30   6. A method according to claim 4,
characterized in that
said network-identifying signal is a visual signal.

7. A method according to claim 4,
35   characterized in that
said network-identifying signal is an audio-visual signal.

AMENDED SHEET

8. A method according to anyone of the preceding claims, characterized in that

the registration request message contains a list

5       containing the device capabilities of the wireless communication device (201a) to be registered.


9. A wireless communication device to be registered (S3a) to a wireless multi-hop ad-hoc network,

10      characterized by

- user interaction and control means (202a, 206a) for controlling the registration and authentication process,

- processing means (208a) for determining the nearest wireless node (201b) in the environment of the wireless

15      communication device (201a) being authorized to register (S3a) said device (201a) to the network by evaluating wirelessly received response messages from said nodes (201b+c),

- decryption means (210a) for decrypting information

20      wirelessly received from, audio-visually signaled and encrypted by the authorized wireless node (201b) by means of a secret key which is known to both the wireless communication device (201a) and the authorized wireless node (201b), and

25      signaling means (204a) for audio-visually signaling (S2b) said information to authenticate the identity of the wireless communication device (201a).